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Patentanmeldung Nr. Patent application No. Demande de brevet n°

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Sheet 2 of the certificate
Page 2 de l'attestation

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TITLE

PACKAGING MATERIAL

An oxygen barrier needed in packaging of products sensible to oxidation is obtained with coextrusion of oxygen barrier resin as EVOH, amorphous nylon, PA6 or PAN.

In liquid packaging, a water barrier is needed together with an oxygen barrier. In this case K. Thompson and al. (EP 0241 819) claims a laminate using nylon as a barrier. Charles E. Gibbons (EP 0293 098) claims a multilayer structure with EVOH and LDPE coated on board. More recently, C. Parks (EP 0520 767) claims the use of amorphous nylon as a non-foil composite laminate. In all cases, water vapour transmission is below 10cc/m²d due to the relatively thick polyethylene seal layer.

In soft cheese packaging the right balance of an oxygen barrier and a moisture barrier is given by a cellulosic film laminate to paper. In this case, the water vapour transmission is between 400 and 630 g/m²d at 38°C and 90%RH, while the oxygen permeability is below 10cc/m²d atm.

SUMMARY OF THE INVENTION

This invention relates to a flexible or semi flexible packaging material with an oxygen barrier between 10 and 100 cc/m²d atm and a water vapour barrier between 100 and 1000 g/m²d at 38°C, 90%RH comprising a paper 20 to 400 g/m², a layer of ethylene copolymer or grafted ethylene copolymer 1 to 5 g/m² adjacent to the paper, and a layer of 10 to 30 gsm of a blend of 5% to 100% of amorphous nylon with PA6.

The ethylene copolymer may be ethylene vinyl acetate, ethylene-ethyl acrylate, ethylene-methyl acrylate or ethylene butyl acrylate. Further, the ethylene copolymer may be an ethylene-acid copolymer or ionomer. Also, the ethylene copolymer or grafted ethylene may be a maleic anhydride grafted ethylene or ethylene copolymer.

The packaging material may be made by means such as by coextrusion coating or lamination of coextruded film to the paper.

Example 1

The tie layer Bynel® 21E533 (an anhydride modified ethylene acrylate resin from DuPont) was coextruded with the oxygen barrier blends of Selar® PA 3426 (an amorphous nylon from DuPont) with Durethan B29 (a PA6 from Bayer) and coated on paper.

The blend was introduced in a 3.5" extruder with barrel temperatures set at 240, 280, 280, 280 and 280°C. The Bynel® 21E533 was introduced in 2.5" extruder with barrel temperatures set at 180, 220, 250, 270, 280°C. Feed bloc and die temperatures were set at 280°C.

The 800 mm wide die was 150 mm (air -gap) above the nip where it coated the paper. The paper was Corona treated and run at the line speed of 200m/min. The final so produced structure was:

paper	//	The Bynel® 21E533 / Selar® PA3426+B29
40 gsm		2 gsm 12 gsm

The composition of the blend was varied. We measured following water transmission (38°C, 90% RH) and oxygen permeability (room temperature):

	water g/ m ² d	oxygen cc/ m ² d atm
80% Selar® PA3426 + 20% Durethan B29	400	32
50% " + "	500	35
20% " + "	800	43

The last structures are well suited for soft cheese packaging.

Example 2

We replaced the Bynel® 21E533 with Surlyn® AD2. We kept all other process parameters such as layer thickness, melt temperatures and line speed constant.

Surlyn® AD2 was coextruded only with the blend 80% Selar® PA3426 + 20% Durethan B29. The oxygen permeability was the same. Water permeability went down to 250 g/m²d.

This structure when extruded on a glossy chill-roll has a very glossy appearance. Together with the dead-foil, it can be used for candy wrapping.

Example 3

Same coextrusion was produced on board 200 g/m². The board was thermoformed to produce trays. The same structure can be used for lidding.

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Claims

1. Flexible or semi flexible packaging material with an oxygen barrier between 10 and 100 cc/m²d atm and a water vapour barrier between 100 and 1000 g/m²d at 38°C, 90% RH comprising
 - a. a paper 20 to 400 g/m²
 - b. a layer of ethylene copolymer or grafted ethylene copolymer 1 to 5 g/m² adjacent to the paper, and
 - c. a layer of 10 to 30 gsm of a blend of 5% to 100% of amorphous nylon with PA6.
2. The packaging material of claim 1 wherein the ethylene copolymer is ethylene vinyl acetate, ethylene-ethyl acrylate, ethylene-methyl acrylate or ethylene butyl acrylate.
3. The packaging material of claim 1 wherein the ethylene copolymer is selected from the group of ethylene-acid copolymers and ionomers.
4. The packaging material of claim 1 wherein the ethylene copolymer or grafted ethylene is a maleic anhydride grafted ethylene or ethylene copolymers
5. The packaging material of claim 1 which is produced by coextrusion coating.
6. The packaging material of claim 1 which is produced by lamination of coextruded film to the paper.

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ABSTRACT OF THE DISCLOSURE

Flexible or semi flexible packaging material with an oxygen barrier between 10 and 100 cc/m²d atm and a water vapour barrier between 100 and 1000 g/m²d at 38°C, 90%RH comprising a paper 20 to 400 g/m², a layer of ethylene copolymer or grafted ethylene copolymer 1 to 5 g/m², adjacent to the paper and a layer of 10 to 30 gsm of a blend of 5% to 100% of amorphous nylon with PA6.